and noting the occurrence and distribution of secondary constrictions and perhaps associated satellites. Jackson notes that a dozen dimensions are available for a modern karyotype description and observes that new ones continue to be developed. Most of the new approaches utilize developments of molecular biology. His article concludes with an interesting consideration of karyotype evolution interpreted in the light of these newer developments.

Arctic and alpine plant life cycles are admirably described by Bliss. These biomes occupy about 15% of the earth's land surface, and occurring as they do at both ends of the earth and upon the higher mountains even near the equator, present uniquely interesting problems in plant evolution and systematics. Bliss' treatment of the ecology of these regions is an excellent basis for contemplating the evolutionary problems presented by their floras. From the simplest generalizations we are led gently from region to region and into the complexities of tundra community dynamics and on to ecological strategies of particular tundra species. This is one article likely to become well-worn through consultation of the vast amount of information it contains.

Studies of co-evolutionary relationships of plants and animals are receiving attention from increasing numbers of students. Janzen's summary of aspects of seed predation by animals is thus of special value. Although written from the zoological standpoint, it complements well Stebbins' article cited above and also the paper of Harper, Lovell, and Moore that appeared in volume 1 of this series. (Ann. Rev. Ecol. & Syst. 1, 1970). The intricate interactions described by Janzen serve admirably to point up opportunities for research in this enormous subject while also showing the pitfalls of naive interpretations of observations.-DALE M. SMITH, Department of Biological Sciences, University of California, Santa Barbara 93106.

A Classification of the Eucalypts. By L. D. PRVOR and L. A. S. JOHNSON. 102 pp. The Australian National University, Canberra. 1971. (Available from International Scholarly Book Services, P.O. Box 4347, Portland, Oregon 97208, \$3.95, softbound.)

The authors present a summary of their goal of almost two decades–a critically assessed and interpreted new classification of the eucalypts, one which integrates the findings of all workers, and not just their immediate colleagues.

After briefly reviewing both old and new classifications, the authors review the types of characters employed in their "(nonnumerical) phenetic" classification. These include various morphological features, but especially characters of the inflorescence, opercular structure, and ovule and seed coat structure. Evidence from chemistry, biotic associations, and genetics also has been considered.

In an interesting approach to describe stages in the process of evolution in changing environments, the authors recognize seven variation patterns, including one referred to as "Phantom". This last is a term originally proposed by Brett to describe a situation where a formerly widespread parent species has disappeared, leaving only traces of itself in the form of deviant disjunct populations. After giving examples of each of these patterns in *Eucalyptus*, a discussion of generic limits ends with the authors' decision not to recognize separate, segregate genera.

The above is presented in twenty pages, while the remainder of the text is devoted to the actual classification. The present volume does not include formal, nomenclatural changes. What does appear is an infrageneric classification that "... follows a rationalized plan explicitly divorced from the traditional system embodied in the International Code of Botanical Nomenclature". This is effected by assigning a code name of 1-6 letters to each taxon. Thus the code for *Eucalyptus parramattensis* is SNECF, S for subgenus *Symphyomyrtus*, N for section *Exsertaria*, E for series *Tereticornes*, C for subseries *Bancroftinae*, and (finally!) F for the species *E. parramattensis*. Readers might take either of two extreme positions: this is a weird, useless code that is taxonomic fallout from the computer age; or, this may be a useful procedure since it summarizes a great deal of detailed taxonomy in a few alphabetical letters. I can sympathize with both views. As the authors point out, a similar coding approach was suggested five years ago by David Hull in Systematic Zoology. Except where an abbreviation is needed for data accumulation in the field, many former supporters of such a system no longer champion it strongly. Why? Because its only advantage was when much electronic information retrieval was restricted to the limits of the 80-column computer card. The third and fourth generation computers states) handle alphabetic information retrieval tasks in a way that was rarely possible in the early days (five to ten years ago!). Coding is no longer necessary.

My point is, that while the proposed coding scheme possesses more information than just a binomial, it also is much more cryptic than a binomial. If one has to look up the code for the full hierarchial classification of a species, he might rather just look at the classification with all taxon names fully spelled out.

To summarize, the authors obviously devoted considerable time to the creation of a taxonomic code. It should prove useful as a shorthand notation *within* a computer, but it is not essential for sophisticated information retrieval. The systematist still probably will always use the binomial to retrieve information. When he wants more insights into taxonomic relations, he probably will still refer to the noncoded columns of Pryor and Johnson's classification.-THEODORE J. CROVELLO, Department of Biology, University of Notre Dame, Notre Dame, Indiana 46556.

Tremellales. By BERNARD LOWY. 153 pp., illustrated. Flora Neotropica Monograph No. 6. Hafner Publishing Company, Inc., New York. 1971. \$12.95, paper bound.

In his introduction to the monograph, Prof. Lowy recounts the history of botanical exploration of Tropical America during the 18th and 19th centuries with emphasis on mycological endeavours, and he sets forth his goal, which is not only to describe all tremellalean fungi that reliably have been reported for the region extending roughly to the 23rd parallels north and south of the equator but also to provide keys that will enable students to identify these fungi. Also discussed are the general characteristics of the Tremellales, phylogenetic relationships, methods of study, geographical distributions, and sources of material examined in preparing the monograph.

The second section of the study, Taxonomic Considerations (reproduced with minor changes from Taxon 17:118-127, 1968), provides a brief analysis of the taxonomic history of the Basidiomycetes from the classic macromorphologic system of classification of Fries to the micromorphologic system pioneered by Patouillard late in the 19th century. Patouillard (and Brefeld, independently) was the first to emphasize the fundamental importance of the basidium and he recognized two major groups of Basidiomycetes, the Hétérobasidiés, having septate basidia, and Homobasidiés having nonseptate basidia. Lowy discusses in greater depth the problems introduced into the classification of the Heterobasidiomycetes by genera such as Tulasnella, Gloeotulasnella, Ceratobasidium, Cerinomyces, and others, which possess characteristics that deny their being allied unequivocally with either the subclass Heterobasidiomycetidae or the subclass Homobasidiomycetidae. After a lengthy evaluation of the ideas of other students of these fungi, the author defends the establishment of a third subclass, Metabasidiomycetidae, to encompass those taxa (1) having an incompletely divided or aseptate basidium with swollen or notably enlarged sterigmata, (2) producing basidiospores germinating by repetition or by production of conidia, and (3) forming basidiocarps that may or may not be waxy or gelatinous. The more narrowly defined Heterobasidiomycetidae includes taxa having completely divided basidia with swollen or notably enlarged sterigmata,